Exhibit 34
(Dkt. No. 338-1)

REDACTED

IN THE UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF WASHINGTON
AT SEATTLE

IN RE: VALVE ANTITRUST LITIGATION	Case No. 2:21-cv-00563-JCC HIGHLY CONFIDENTIAL – ATTORNEY'S EYES ONLY

REPLY EXPERT REPORT OF ASHLEY LANGER, PH.D.
IN SUPPORT OF VALVE'S DAUBERT REPLY

August 12, 2024

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1. Assignment

1. I have been asked by counsel to respond to claims put forth by Plaintiffs' economic expert Dr. Steven Schwartz in his July 12, 2024 reply report that relate to Valve's May 17, 2024 motion seeking to exclude his testimony.[1] Specifically, I have been asked to assess the economic validity of Dr. Schwartz's reply report as it relates to two-sided modeling, his calculations of but-for market shares, his pass-through estimates, and his disregard of the potential impact of Steam keys on his estimated damages calculations.

2. **Appendix A** contains the list of the materials I relied upon in forming my opinions.

2. Dr. Schwartz's disregard of Steam keys makes his proposed damages estimation unreliable

3. Members of the proposed class vary widely in their use of Steam keys, and this variation is crucial to understanding whether and to what extent proposed class members were harmed by Valve's alleged conduct.[2] This variation, which Dr. Schwartz ignores, renders his damages model incapable of estimating harm for members of the proposed class. In his reply report, Dr. Schwartz defends his choice to disregard Steam keys by asserting that "Accounting for Steam Key usage in calculating effective revenue share"—the approach I use in my opening report—"lacks any economic merit."[3] This assertion stands in conflict with the facts and economic reality. Dr. Schwartz agrees that Valve does not charge a revenue share on Steam keys.[4] He agrees that users who purchase a Steam key gain access to the Steam version of the game and play the game on Steam through their normal Steam Library as if they had bought it on Steam.[5] He acknowledges that publishers earn revenue from their sale of Steam keys.[6] However, he does not explain how his

[1] Reply Class Certification Expert Report of Steven Schwartz, Ph.D., July 12, 2024 ("Schwartz Reply Report").

[2] Class Certification Expert Report of Ashley Langer, Ph.D., May 17, 2024 ("Langer Opening Report"), ¶¶ 98–100, 146–147, Exhibit 1. For example, during the class period, users have redeemed many Steam keys for games published by Named Plaintiff Wolfire Games but none at all for games published by [redacted].

[3] Schwartz Reply Report, ¶ 213.

[4] Class Certification Expert Report of Steven Schwartz, Ph.D., February 8, 2024 ("Schwartz Opening Report"), footnote 827.

[5] Schwartz Opening Report, ¶ 45.

[6] Deposition of Steven Schwartz, April 18, 2024 ("Schwartz Deposition"), pp. 79:14–23.

proposed damages model could incorporate these revenues (or how to do so without individualized inquiry).[7]

4. Perhaps most importantly, Dr. Schwartz offers no rebuttal to the empirical fact that publishers use Steam keys at widely varying rates, and that accounting for these differences when determining damages would require individualized inquiry.[8] My opening report demonstrates this variation across members of the proposed class.[9] As Exhibit 1 below shows, the magnitude of Steam key issuances and redemptions can be substantive: for example, users acquired more games from Wolfire Games by redeeming Steam keys than they purchased through Steam directly since 2010 (approximately [redacted] times as many by the time the class period even started—[redacted] keys redeemed versus [redacted] units purchased). In contrast, users did not redeem any Steam keys for games published by [redacted] during the class period even though [redacted] recorded [redacted] revenues (over [redacted]) on Steam.[10] Dr. Schwartz claims this variation in Steam key sales—from which Valve earns no revenue—has no impact on the alleged damages of either publisher. However, to suggest that Steam keys are unimportant to a determination of damages for a publisher like Wolfire Games contradicts the facts and economic reality: Steam key redemptions outnumber Wolfire Games' unit sales on Steam for its games, as shown in Exhibit 1. Exhibit 1 compares Wolfire Games' cumulative unit sales on Steam (which are subject to Valve's revenue share) with its cumulative Steam key issuances and Steam key redemptions (neither of which are subject to Valve's revenue share).[11] Ignoring the revenue publishers earn through their use of Steam keys on the Steam platform—and the variation in this revenue across publishers—may substantially affect any damages calculation.[12]

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7 Langer Opening Report, ¶ 99 ("However, Valve does not have any data on the number of Steam keys sold or the prices at which those Steam keys were sold because those sales occur outside of Steam... Without this individualized information on each publisher's sale of Steam keys—information that could only be collected, if at all, by obtaining every publisher's sales records (assuming it maintains its Steam key sales data, which Named Plaintiff Wolfire Games did not)—Dr. Schwartz cannot calculate accurate effective revenue shares for proposed class members.").

8 Langer Opening Report, Exhibit 4.

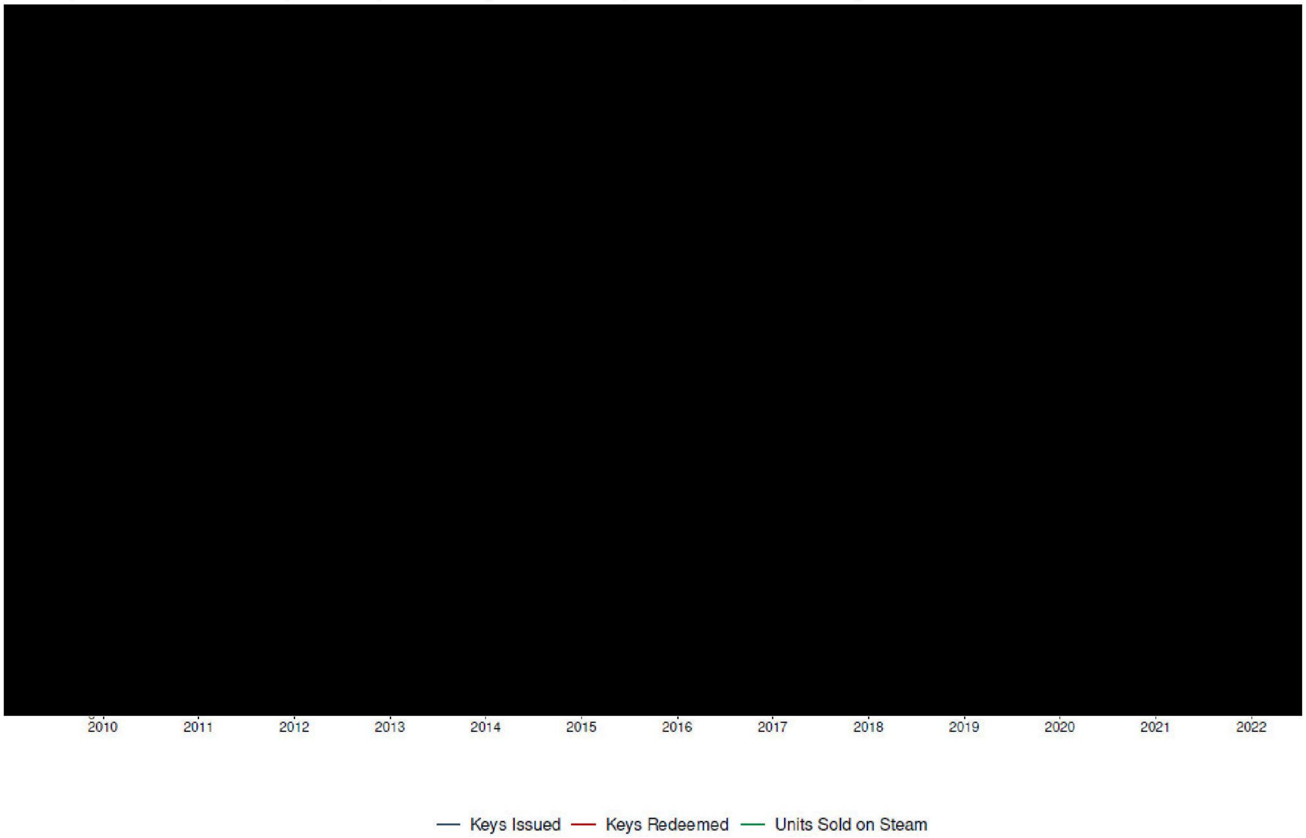
9 Langer Opening Report, Exhibits 1, 8, 9.

10 Langer Opening Report, ¶ 98, Exhibit 1.

11 Langer Opening Report, ¶ 58. Wolfire Games does not have records of its total Steam key sales. See Langer Opening Report, ¶ 99. I understand that total Steam keys sold cannot exceed the total number of Steam keys issued, but Steam key sales can exceed the total number of Steam keys redeemed if some purchasers did not redeem their Steam keys. See Class Certification Expert Report of Lesley Chiou, Ph.D., May 17, 2024 ("Chiou Report"), footnote 670.

12 Langer Opening Report, ¶¶ 88, 100.

Exhibit 1
Wolfire Games Steam Keys Issued, Steam Keys Redeemed, and Steam Unit Sales, 2010–2022



Source: Schwartz Opening Report and backup materials (Schwartz Analysis Data); Steam Key Redemptions Data; Steam Key Requests Data
Note:
Cumulative yearly totals of Steam keys issued, Steam keys redeemed, and units sold on Steam are plotted. The vertical dashed line at 2017 approximates the beginning of the class period. Prior to the start of the class period on January 28, 2017, Wolfire Games was issued [redacted] Steam keys, had [redacted] Steam keys redeemed, and sold [redacted] units on Steam. Steam key request data are not available prior to January 1, 2013. See Chiou Report, ¶ 469.

3. Dr. Schwartz fails to model Steam as two-sided, rendering his methodology incapable of estimating damages—if any—for the proposed class

5. As a two-sided platform, Steam benefits from network effects (or network externalities), meaning that publishers value a platform with more consumers, and consumers value a platform with more games and publishers.[13] Dr. Schwartz acknowledges that Steam is a two-sided platform.[14]

[13] Langer Opening Report, ¶¶ 60–61. Consumers also value a platform with more consumers, and publishers also value a platform with more publishers.

[14] Schwartz Opening Report, ¶¶ 30, 57; Schwartz Reply Report, ¶ 202 ("The market is two-sided; there is no disagreement on that point.").

6. Dr. Schwartz, however, chooses to model Steam's pricing as one-sided.[15] Specifically, Dr. Schwartz only models ways in which Valve sets prices to publishers.[16] He does not model the ways in which Valve makes consumer-facing pricing, innovation, or marketing decisions, or the ways in which platforms compete for consumers. By modeling a two-sided platform as one-sided, Dr. Schwartz cannot estimate damages relative to a but-for world without the alleged conduct.[17]

7. The academic literature is clear that Steam must be analyzed as a two-sided platform. Even though Valve does not charge consumers a positive direct fee to access the platform or to buy games, it does charge users direct fees in certain instances (e.g., transaction fees on Steam Community Market purchases of virtual items used in games sold on Steam).[18] Valve economically behaves and operates as a two-sided platform, necessitating a two-sided model.

3.1. Dr. Schwartz's contention that he can model Steam as a one-sided platform is unsupported by the academic literature

8. Dr. Schwartz acknowledges the very restrictive requirements that would allow one to model a two-sided platform as one-sided.[19] The papers cited by Dr. Schwartz characterize

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[15] Schwartz Reply Report, ¶ 202 ("Steam's pricing conduct can be modeled as one-sided because the volume of transactions on the platform depends only on the aggregate price level and not the way this price is allocated between buyers and sellers.").

[16] Schwartz Opening Report, ¶ 340 ("I evaluate Steam's but-for price under models with a single, direct price to one side of the platform.").

[17] Langer Opening Report, ¶ 25.

[18] Steam, "Community Market FAQ," available at https://help.steampowered.com/en/faqs/view/61F0-72B7-9A18-C70B#steamfee, accessed on August 8, 2024 ("The fee is currently 5%.").

[19] Schwartz Opening Report, ¶ 338; Jean-Charles Rochet and Jean Tirole, "Platform Competition in Two-Sided Markets," *Journal of the European Economic Association*, 1(4), 2003, pp. 990–1029 ("Rochet and Tirole (2003)") at pp. 1019–1020 ("There are three broad reasons why neutrality does not hold in practice: a) Transaction costs… b) Volume-insensitive costs… c) Platform-determined constraints on pass-through."). The two-sided market literature has long recognized that analyzing prices only on one side can yield false predictions about market power. See David Evans and Richard Schmalensee, "The Antitrust Analysis of Multisided Platform Businesses," in *The Oxford Handbook of International Antitrust Economics*, eds. Roger D. Blair and D. Daniel Sokol (New York: Oxford University Press, 2014), pp. 404–448 at p. 423 ("Several authors have warned against basing judgments about market power on analysis of only a single side of a multisided platform (Argentesi and Filistrucchi 2007; Evans 2003b; Song 2013; Weyl 2010; Wright 2004) … Therefore examining price on that side would result in a false negative test result for market power. A platform could also earn a competitive rate of return yet price significantly above marginal cost on one side. Therefore examining price on that side would result in a false positive test result for market power."). Further, the literature also recognizes that whether an industry is two-sided can influence calculating damages. See Marc Rysman, "The Economics of Two-Sided Markets," *Journal of Economic Perspectives*, 23(3), 2009, pp. 125–143 ("Rysman (2009)") at p. 138 ("Several other areas of antitrust analysis use price behavior intensively. For instance, computing damages often involves computing counterfactual prices, such as the price that would have arisen if firms had not colluded. Such a computation could easily be influenced by whether a market is two-sided or not.").

this as a high bar to overcome, concluding that "markets with network externalities are predominantly two-sided markets."[20]

9. To model a two-sided platform as one-sided, it must be the case that each side of the platform–here, game sellers and game buyers–can coordinate in such a way as to perfectly allocate any platform fee charged to *one* side of the platform across to the *other* side of the platform. The logic is that if all costs and all prices were set on a per-transaction basis for both sides of the platform, then—when certain other conditions are also met—it would not matter whether the price is set towards the consumer side or the seller side. In order for this "one-sided" logic to hold, it must be true that, for instance, if consumers have to pay a 10 percent additional cost of the sales price per game, then publishers would adjust their prices to take into account the fact that consumers would have to pay an extra 10 percent.[21]

10. This logic often fails in markets with network externalities for a number of reasons. One is that not all costs are structured on a per-transaction basis. Consider credit cards. Many rewards credit cards charge *per-transaction* fees to vendors, but charge a *fixed fee* (which is a "volume-insensitive" fee) to users. This complicates the ability of the vendors and users to offset the pricing structure used by the platform. Users will use their credit cards at varying rates, which means that vendors cannot adjust their transaction prices to offset the prices that are charged by the network.[22] The academic literature is clear that when costs include a volume-insensitive component, it is improper to treat a two-sided market as having only a single price: because the fee paid by the consumer cannot be easily offset by a decreased fee per transaction by the seller, a one-sided approach is insufficient. [23]

20 Rochet and Tirole (2003), p. 1020.

21 The precise allocation of the fee from one side of the platform to the other may need to be very complex in order to yield no change in consumption, and therefore incentives. For example, if consumers have to pay a 10 percent fee, that cost would potentially reduce consumer activity on the platform and thereby reduce the network benefits that publishers receive and value. Under the conditions that a platform could be analyzed as one-sided, it would need to be the case that sellers would adjust their prices to internalize some of this higher cost to consumers to balance the consumer-generated network effect. The key is that the interaction between consumers and sellers would need to appropriately equilibrate the allocation of costs and impact of network effects on both sides of the platform, allowing the econometrician to analyze only one side of the market. If consumers are bearing costs that do not scale with purchases, then sellers cannot appropriately counterbalance these costs.

22 Note that Rochet and Tirole (2006) use the same example to illustrate why existence of volume-insensitive costs makes a platform two-sided. See Jean-Charles Rochet and Jean Tirole, "Two-Sided Markets: A Progress Report," *The RAND Journal of Economics*, 37(3), 2006, pp. 645–667 ("Rochet and Tirole (2006)") at p. 651.

23 Rochet and Tirole (2003), p. 1019 ("Neutrality also fails when at least one side of the market incur costs that are a) influenced by the platform and b) are not proportional to the number of transactions on the platform.").

11. Costs can be both positive and negative.[24] I use the term "membership benefits" to refer to negative membership costs that represent the benefits that Steam's features offer to the platform's users.[25]

12. The academic literature is clear that Remote Play, and other membership benefits I mention in my opening report, are volume-insensitive.[26] Because Remote Play's benefits are incurred proportional to the volume of *time spent playing all games that use this feature* (rather than to the *number of purchases*), publishers cannot capture the benefits customers receive merely by increasing the cost of their games–a key characteristic of volume-insensitive benefits ignored by Dr. Schwartz in his reply report. Moreover, by reducing multiplayer development costs, Remote Play provides a different volume-insensitive benefit to *publishers and developers* than to consumers.[27]

13. Many of the other features I list in my opening report are also volume-insensitive.[28] For example, using social features on Steam does not directly depend on the number of titles

[24] Langer Opening Report, ¶ 131.

[25] Langer Opening Report, ¶¶ 130–131. Langer Opening Report, ¶ 130. Outside of the video game context, an example of a volume-insensitive membership benefit would be credit card holders' free access to VIP privileges (e.g., to an airport lounge) or travel insurance. Vendors, for example, would not be expected to decrease their prices in case these membership benefits become unavailable. Since these "membership benefits" are "sunk" when the vendor and credit card user interact, they cannot influence the pricing of their transaction. See Rochet and Tirole (2006), p. 651 ("When the two sides transact ex post, fixed costs are sunk and therefore irrelevant…The nonneutrality of fixed fees is most dramatically illustrated by the following extreme but telling example, example, due to Wright (2003)… Consider a merchant (a monopolist, to simplify the exposition) selling a merchandise with value v (when purchased by cash) to consumers."). Note that in this context, there is also an additional limitation on pass-through. See Rochet and Tirole (2003), p. 1020 ("The platform may also take steps that limit the extent of pass-through. A case in point is the no-discrimination-rule adopted by credit card associations (Visa, MasterCard) and for-profits (Amex). Merchants do not pass the merchant discount through only to cardholders. So there is only a partial pass-through between the two sides."). See also Langer Opening Report, ¶ 131, footnote 179.

[26] The Rochet and Tirole (2003) article I cite in my opening report—the same article Dr. Schwartz relies upon in ostensible support of his one-sided approach to modeling—also argues that game distribution is two-sided and has volume-insensitive costs. Rochet and Tirole (2003), pp. 1019–1020 ("For example, while software developers incur some costs, such as the per-game royalties paid by game developers, that are proportional to sales, many costs are insensitive and affected by the platform: The fixed development cost is influenced by platform through software design, and so is the fixed charge for the development kit. On the user side, getting familiar with the platform's user interface may also involve some fixed costs."). While Dr. Schwartz claims that the academic literature I cite on two-sided platforms refers only to consoles and not PC platforms like Steam (Schwartz Reply Report, ¶ 204), he does not provide an explanation as to why these costs, as mentioned by Rochet and Tirole, are not relevant for Steam. Further, Weyl (2010) acknowledges that video game platforms (not only consoles) are two-sided. E. Glen Weyl, "A Price Theory of Multi-Sided Platforms," American Economic Review, 100(4), 2010, pp. 1642–1672 ("Weyl (2010)") at pp. 1663–1664 ("I believe this model provides a better approximation to many two-sided markets than any of the other unidimensional models. It seems to me a fairly good fit to software platforms (operating systems, video games etc.), dating clubs, commercial intermediation (supermarkets, stock markets, eBay, etc.) and Internet service provision.").

[27] Langer Opening Report, ¶ 130.

[28] Dr. Schwartz claims that the membership benefits I list are not volume-insensitive (Schwartz Reply Report, ¶ 205). This appears to be based on the mistaken belief that *any* correlation between the total purchases made by a consumer and the way the consumer values membership benefits makes the benefits not volume-insensitive. But even if Dr. Schwartz claims that the value of these features is *correlated* with purchases, the value to users *cannot be priced by publishers on a per-transaction basis*, which is what is required for a two-sided platform with volume-

purchased. Users on Steam can play a single free-to-play game such as Apex Legends and use Steam's social features heavily, or buy dozens of single-player games and use Steam's social features sparingly or not at all; the value of these features does not depend on the quantity of transactions.[29] The simple fact that free-to-play titles exist, or that play time varies across games and users, makes it plain that Valve's features cannot be priced on a per-transaction basis, and that Steam must be modeled as a two-sided platform.[30]

14. Ultimately, Dr. Schwartz's reply report does not show why the specific volume-insensitive costs acknowledged by Rochet and Tirole for video game consoles and other platforms would not also apply to PC game distribution. I have shown that several of these costs do.

3.2. Dr. Schwartz's contention that he can model Steam as a one-sided platform ignores that game distribution platforms (including Steam) offer high quality features to compete for consumers

15. The discussion of membership benefits and volume-insensitive costs is not merely an academic disagreement. The record is clear (and Dr. Schwartz acknowledges): Steam uses features to compete for consumers.[31] In addition, Prof. Chiou shows in her report that platform features are a particularly important form of differentiation for Steam in competing for consumers.[32]

16. As a result, both the actual business practices used by Steam, and the economics of two-sided markets, tell the same story. Membership benefits act as a negative consumer-facing price and subsidize the consumer side of the two-sided platform.[33] Valve's substantial investment in features consumers value demonstrates that Valve considers

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insensitive costs to be modeled as one-sided. Rochet and Tirole (2003), p. 1020 ("End user transaction-insensitive prices and non-price attributes of a platform affect the number of end users or applications, but not directly the terms of the transactions between the end users.").

29 The other examples Dr. Schwartz attempts to dismiss are similarly volume-insensitive despite his claims to the contrary. Dr. Schwartz argues that storing users' libraries indefinitely is volume-sensitive, missing the fact that this feature (as similar features, such as cloud saves) will be provided to consumers whether they purchase a single game or thousands of games. See Schwartz Reply Report, ¶ 205 ("The benefit of accessing a game purchased on Steam is by definition contingent on the purchase of that specific game."). Similarly, Dr. Schwartz contends that other social features are volume-sensitive because they will scale with the number of games purchased, ignoring that the time spent playing a game, and the social features a user will want to play with a game, may vary widely. See Langer Opening Report, ¶ 50.

30 To understand why play time matters, a user might intend to play one game for 1,000 hours and another game for 10 hours, and both games might use the same or different features. Feature use (and feature value) by users varies in a way that publishers cannot reliably incorporate into their pricing structure.

31 Langer Opening Report, ¶ 63; Schwartz Reply Report, ¶ 165.

32 Chiou Report, Section 5.

33 Langer Opening Report, ¶ 131.

the market as two-sided and does not believe that publishers can fully compensate consumers for the benefits that those features provide by adjusting game prices.

17. Dr. Schwartz neglects this kind of competition when he argues that he does not need to model both sides of the platform because considering competition for both sides of the market would "depart from Valve's actual behavior."[34] This is incorrect for at least two reasons. First, Valve considers Steam a two-sided platform; the fact that Valve does not currently charge consumers for every feature does not mean that Valve would not charge for some or all features in the different circumstances of the but-for world.[35] Second, and more importantly, Dr. Schwartz appears to believe that Valve needs to charge a positive direct consumer fee in order to be two-sided, but that misses the economic substance, supported in the economics literature, underlying Steam's features on a two-sided platform.[36]

18. Dr. Schwartz even claims that feature competition is "irrelevant,"[37] but he has not performed any analysis showing that is true. As a result, his one-sided model fails for at least two reasons: (i) he does not meet Rochet and Tirole's conditions to model a platform as one-sided, because Steam offers features to attract consumers and the value of these features (negative costs) do not directly depend upon the volume of transactions; and (ii) he ignores the video game industry's wide use of such features and costs (positive or

[34] Schwartz Reply Report, ¶ 202 ("It would depart from Valve's actual behavior, without any reasonable basis for doing so. It would not be consistent with Valve's real-world pricing conduct on Steam or the conduct they would most likely engage in in the but-for world.").

[35] Valve already charges both users and publishers in a different context: on Community Market transactions on Steam. Users transfer virtual items in exchange for virtual currency on Steam's Community Market. Valve charges a 5% "Steam Transaction Fee" on these transfers. In addition, publishers also often charge a "game fee" on these transactions and pay a revenue share to Valve on the "game fee." See Steam, "Community Market FAQ," available at https://help.steampowered.com/en/faqs/view/61F0-72B7-9A18-C70B#steamfee, accessed on August 8, 2024 ("The fee is currently 5%."); 30(b)(6) Deposition of Erik Peterson (Valve), November 15, 2023, Exhibit 295 VALVE_ANT_0000008–15 ("Unless a different revenue-sharing arrangement is agreed to by the parties, Company's share of the Net Game Fee will be equal to seventy percent (70%)."). In addition, Epic explicitly charges consumers a per transaction fee related to certain payment methods in certain countries. See Epic Games Store, "Frequently Asked Questions," available at https://www.epicgames.com/site/en-US/epic-games-store-faq, accessed on August 8, 2024 ("The Epic Games Store supports credit cards, PayPal, and a variety of alternative payment methods. Below is a list of the alternative payment methods we currently support. Methods carrying additional payment processing fees are marked with an *asterisk."). Finally, some credit cards explicitly charge card users (often a yearly fee) while others do not. See Becky Pakora, "Credit Card Annual Fees: Are They Worth It?", *Forbes*, June 24, 2024, available at https://www.forbes.com/advisor/credit-cards/credit-card-annual-fees-are-they-worth-it/, accessed on August 9, 2024 ("Although some commonly-held credit cards don't charge an annual fee, other popular cards charge hundreds of dollars per year. Weighing a card's annual fee alongside its benefits is the key to determining if it is worth what you are charged.").

[36] Rysman (2009), p. 129 ("Many consumers are in effect paid to use a credit card—with rewards programs such as contributions to frequent flyer plans."). See also Rochet and Tirole (2006), p. 659 ("Accordingly, it is quite common for a platform to charge below-cost (perhaps zero) prices to one side and high prices to the other. For example, media platforms usually give away newspapers or free TV programs not to prey on rival platforms, but to be able to charge higher markups to advertisers.").

[37] Schwartz Reply Report, Section 7.1.1.

negative) that do not directly depend upon transaction volume. These are the exact costs which have led the academic literature to highlight the importance of such feature competition and recognize that video game platforms are two-sided.[38]

19. Valve has a clear incentive to compete for both consumers and publishers and attract them to the Steam platform. Even if the outcome is that Steam collects payments (the revenue share) from one side only, this does not mean that Steam is a one-sided platform or that it can be modeled as one.[39] That does not reflect how Steam benefits from consumers as a two-sided platform, and how it subsidizes and competes for consumers via features. Reliably modeling the incentives of market participants is critical to building a model that can reflect industry behavior.

3.3. Dr. Schwartz incorrectly asserts that his damages model is two-sided

20. Despite the fact that Dr. Schwartz explicitly only models prices on one side of Steam, he asserts that his model is two-sided.[40] His claims here contradict his own arguments in his opening report and the academic literature he cites; a model cannot be two-sided if it fails to capture pricing behavior on both sides of the platform.[41]

[38] For example, in the video game context, see Rochet and Tirole (2003), p. 1020 ("End user transaction-insensitive prices and non-price attributes of a platform affect the number of end users or applications, but not directly the terms of the transactions between the end users."). See also Weyl (2010) at pp. 1663–1664 ("Newspaper readers and software producers, to name a few, clearly differ substantially in their membership benefits and costs, respectively, of participating in a platform.... I believe this model provides a better approximation to many two-sided markets than any of the other unidimensional models. It seems to me a fairly good fit to software platforms (operating systems, video games etc.), dating clubs, commercial intermediation (supermarkets, stock markets, eBay, etc.) and Internet service provision)."), footnote 41 ("Users typically derive some value from the platform itself and some proportional to the media (games or programs) on the platform.").

[39] For example, see Rochet and Tirole (2006), pp. 658 ("A market is two-sided in two cases: (i) Either the split of marginal prices satisfying $a^B + a^S = a$ is non-neutral (something we have studied in Section 3), (ii) or the split of marginal prices is neutral but the structure of fixed fees matters."), 665 ("Factors making a market two-sided include (a) transaction costs among end-users or, more generally, the absence of, or limits on the bilateral setting of prices between buyer and seller, (b) platform-imposed constraints on pricing between end-users, and (c) membership fixed costs or fixed fees.").

[40] Schwartz Reply Report, ¶ 198 ("Dr. Langer wrongly claims that 'by modeling the industry as "one sided," Dr. Schwartz ignores that some of the value of platforms comes from building and maintaining a base of consumers and publishers.' While Valve charges a single fee, I am not modeling the industry as one-sided.").

[41] Schwartz Reply Report, ¶ 202 ("Rochet and Tirole (2006) define a market as one-sided if the number of purchases depends only on price level and not price structure."); Rochet and Tirole (2006), pp. 664–665 ("Our first objective has been to propose such a definition: a market is two-sided if the platform can affect the volume of transactions by charging more to one side of the market and reducing the price paid by the other side by an equal amount; in other words, the price structure matters, and platforms must design it so as to bring both sides on board.").

21. In his reply report, Dr. Schwartz argues that his model is two-sided because it considers pass-through.[42] It is not. Markets are two-sided because consumers and sellers each act as independent decision-makers, and each side benefits both from the presence of the other and responds to decisions of the other.[43] Steam meets this criterion because it considers the incentives of both sides and sets its prices and quality accordingly.[44] For example, Valve's membership benefits provide additional incentives for consumers to join Steam. The choices of consumers in responding to publishers' and Valve's actions are absent from Dr. Schwartz's model.[45] Dr. Schwartz ignores how Valve's incentives to provide membership benefits would change if its market share were considerably smaller, how consumers would respond to this change, and how publishers would respond to a change in consumer base. Calculating pass-through is not two-sided modeling, because it does not engage at all with the direct and indirect network effects from consumer presence on the platform. Nothing in Dr. Schwartz's pass-through analysis is specific to this two-sided setting; estimating pass-through could be done in a one-sided setting (*e.g.*, when analyzing pass-through of an ad valorem tax).[46] Dr. Schwartz's analysis is not the correct model for a two-sided platform because it ignores pricing behavior, including negative pricing in the form of membership benefits, on the consumer side.

22. Additionally, Dr. Schwartz incorrectly argues that he does not need to consider how prices for consumers change in the but-for world because he can assume that membership benefits will improve as long as there is "more competition."[47] First, Dr. Schwartz simply assumes this is true; his model is incapable of making a prediction about competition for consumers. Second, even if it were true that competition were to increase, it does not follow that membership benefits would increase. In the but-for world Dr. Schwartz proposes with fewer consumers, publishers, and transactions on Steam, Valve would

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42 Schwartz Reply Report, ¶ 200 ("My analysis of pass-through also demonstrates that I analyze the market as two-sided.").

43 Langer Opening Report, ¶¶ 60–61.

44 For example, Steam acknowledged indirect network effects (from publishers to users) when it proposed to introduce revenue share price tiers and intended to "reward games that encourage platform network effects." See Valve Presentation, "Steam Rev Share – Group Update," VALVE_ANT_0046076 at p. 2. ("Large games draw the most customers to Steam. These games have positive externalities. More customers can find other diverse games (market network effects). More customers means more friends, forum posts, reviews etc. (social network effects)… We should reward games that encourage platform network effects.").

45 Langer Opening Report, ¶ 21.

46 Dr. Schwartz describes Steam's revenue share as "akin to an ad valorem tax." See Schwartz Opening Report, ¶ 381. Ad valorem taxes are not specific to two-sided industries and academic researchers estimate pass-through of ad valorem taxes more generally. For an example in the French alcoholic beverages context, see Clément Carbonnier, "Pass-through of Per Unit and ad Valorem Consumption Taxes: Evidence from Alcoholic Beverages in France," *The B.E. Journal of Economic Analysis & Policy*, 13(2), 2023, pp. 837–863.

47 Schwartz Reply Report, ¶ 206 ("The likely outcome is that competition would compel Valve to enhance the Steam platform to meet the challenge of its rival platforms… By holding these membership benefits fixed, I provide a lower bound estimate on damages to publishers.").

incur higher costs per consumer or publisher to develop and maintain platform features.[48] These higher costs may not have as high a payoff in terms of increased consumer or publisher participation on Steam because of reduced network effects and, as a result, Steam might provide fewer of these features.[49] Therefore, features and membership benefits may not improve in such a but-for world, so it is important to use a model that is capable of analyzing membership benefits and competition for consumers. Dr. Schwartz's model cannot.

23. In sum, Dr. Schwartz has modeled only a single side of a two-sided market. His model thus fails to consider the ways in which publishers compete for consumers in the as-is world, how they would compete for consumers in the but-for world, and how that would affect competition for publishers in the but-for world. Dr. Schwartz's model of the but-for world ignores economic and business reality and cannot reliably predict real economic behavior.

3.4. Dr. Schwartz similarly fails to analyze Steam as two-sided in his Platform Competition Model

24. Dr. Schwartz's PCM assumes one-sided pricing by the platform and does not include network effects or non-price dimensions of competition (such as changes in platform features).[50] In particular, because platform features cannot change over time within his model, the *only* possible response by the platforms to the removal of the PMFN is that they change the revenue shares they charge the publisher on the platform (*e.g.*, the platform cannot increase or decrease membership benefits).[51] As such, his PCM is subject to the same critiques I lay out above regarding the one-sided analysis in his damages model. It does not and cannot analyze Steam or its competitors in the two-sided context of the video game industry.

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[48] Dr. Schwartz claims Steam's market share would drop from [redacted] percent to [redacted] percent. See Schwartz Opening Report, ¶¶ 361 ("I use [redacted]% as Steam's real-world market share…."), 376 ("I adopt Valve's [redacted]% share of revenues as Steam's but-for market share."). Assuming the cost of developing and maintaining these features is fixed and that the size of Dr. Schwartz's alleged market would remain the same in the but-for world, the cost per consumer could be higher by a multiplier of [redacted].

[49] This is not merely hypothetical but is also consistent with the Epic Games Store's strategy in the real world. The Epic Games Store, a platform with fewer consumers, publishers, and transactions, appears to offer less features. See Chiou Report, ¶ 221 ("I find that Steam is richer in features than competing platforms along the feature categories presented in Exhibit 14."). See also Chiou Report, Exhibit 14.

[50] Langer Opening Report, ¶ 177. See also Langer Opening Report, ¶ 38 ("In their model there are only two platforms, one publisher, one product, no network effects, no customer pricing or discounts , and no strategies that take time for the platforms or the publisher to implement.").

[51] See Langer Opening Report, ¶ 177, Section 5.4; Deposition of Ashley Langer, Ph.D., June 21, 2024, pp. 160:21–162:24 ("Let me just, since we're talking about it, point out that in this model while there are two sides to

4. Dr. Schwartz's but-for market share analysis is unreliable because it depends on his one-sided analysis of platforms and other assumptions that do not comport with industry facts

25. In his reply report, Dr. Schwartz dismisses my concerns regarding his but-for market share analysis because his "conclusion of significant damage to developers is not sensitive to but-for market shares."[52] Both Dr. Schwartz's dismissal of my concerns and his conclusion that his model is not sensitive to these concerns are incorrect for several reasons.[53]

26. First, any economic impact of Dr. Schwartz's but-for market shares is masked by the fundamental problems with his proposed damages model. As highlighted in Section 3, Dr. Schwartz's model fails to capture the two-sided nature of the video game industry. As Dr. Schwartz's model suffers from this fundamental flaw, it cannot reliably assess damages even if Dr. Schwartz had proposed a reliable methodology to calculate but-for market shares. Dr. Schwartz's model cannot assess how damages respond to different but-for market shares because it fails to capture the economic fundamentals of two-sided platforms.

27. Second, Dr. Schwartz's but-for market shares are based on an analysis of publishers' incentives for selling their own games that differ significantly from distribution platforms' incentives for selling many publishers' games. There is no reason to believe that publishers' sales of their own games on Steam are a good proxy for distribution platform market shares for sales of many publishers' games. While network effects are important to distribution platforms, they are not necessarily important to a publisher's portfolio of its own games.[54] This creates a difference in incentives. Publishers succeed on Steam by

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the market, there are a substantial number of assumptions to simplify the analysis, including, for instance, the absence of membership benefits or membership costs, which Boik and Corts point out makes the analysis more simple but also, in our context, removes it from the realities of what happens in this industry.... Dr. Schwartz is -- is putting forward an argument that he can model a two-sided platform as one-sided. That requires him to show that he can do that. He has not provided evidence of that.").

52 Schwartz Reply Report, ¶ 228, Figure 6.

53 While not fundamental to my critique of his methodology, I do not agree with his assertion that his estimated damages are "not sensitive to but-for market shares." His proposed damages in his opening report are around $3 billion. In his reply report, he estimates that damages would be around $1 billion if Valve's market share were to be [redacted] percent in the but-for world. See Schwartz Opening Report, Figure 9; Schwartz Reply Report, ¶ 229.

54 Some publishers might benefit from network effects based on the number of players of their specific games, whereas all platform operators benefit from network effects both from the number of first-party titles they sell on the platform, and from the total transaction volume from third parties on the platform. For example, network effects might be important for a publisher that specializes in massively multiplayer online role-playing games (MMORPGs) such as World of Warcraft. See Ke Rong, Qun Ren, and Xianwei Shi, "The Determinants of Network Effects: Evidence from Online Games Business Ecosystems," *Technological Forecasting and Social Change*, 134, 2018, pp. 45–60 at p. 45 ("It is noted that in order to maintain or extend the lifespan of an MMORPG ecosystem, the game developers have to attract enough players. These players will interact frequently and gradually build up an online gaming

making products that sell to customers, whereas platform operators like Steam succeed by bringing publishers and consumers together for the platform as a whole. For publisher shares to be a reasonable proxy for platform market shares in the but-for world, Dr. Schwartz would need to establish similarities in their economic incentives and business strategies, for example. He has not done so.

28. Third, Dr. Schwartz's but-for market share assumption is—according to his testimony—only applicable to Steam and not to other publishers in his analysis,[55] casting doubt on the reliability of such an assumption. Logically, if Dr. Schwartz's assumption—that *publishers'* shares on Steam between 2008 and 2012 are a reliable estimate of their *platform* share of game distribution for the class period—were based on sound economic reasoning, then that assumption should hold for all of the publishers he is analyzing. However, if the assumption does not hold for some of the publishers he is analyzing, there is no reason to believe that it holds for others, including Valve. Indeed, Valve's share of its own games on Steam among these publishers varied between [redacted] percent and [redacted] percent between 2008 and 2012, undermining Dr. Schwartz's claim that he can use publishers' sales of their own games on Steam from 2008 to 2012 to estimate Steam's market share in the sale of all publishers' games in but-for world.[56] Because he has provided no economic reasoning to support that his assumption holds for Valve but not for others, his prediction for Valve is equally unsupported.

29. Finally, Dr. Schwartz's but-for market shares are unreliable because he assumes fixed market shares in an industry that experienced changes over time. For example, the Epic Games Store began operations in 2018.[57] Dr. Schwartz's but-for market shares do not include the Epic Games Store, ignoring that the video game industry changed since his

community. These communities will then generate a 'social bandwagon' (Secchi, 2009) through which they will influence individual players to engage in the game.").

55 Schwartz Deposition, pp. 99:21–100:8 ("Q. Do you believe that in the but-for world, [redacted] will operate a platform with a market share of [redacted] percent between 2017 and 2021? A. I don't know and I don't need to know. It doesn't -- what I need to know is what the but-for -- approximate but-for market share is for Valve who comprises the remaining roughly [redacted] percent of the market and how that's distributed across the various platforms is not an essential element of my analysis."), 100:18–101:7 ("Q. So you're saying, for example, that [redacted] share could be higher than [redacted] percent and [redacted] share could be lower than [redacted] percent? A. What I'm saying is that there will be other platforms that will comprise the [redacted] percent of the rest of the market. Whether it is comprised of [redacted], and [redacted] only, whether it will be some subset of this group plus others who may have entered and failed or thought about entering and chose not to is not what is important."), 109:7–17 ("[A.] ... I don't know nor do I need to know what [redacted] or [redacted] or [redacted] or [redacted] or [redacted] or [redacted] or [redacted] do in the but-for world. I don't need to know whether any of them would have had some form of distribution. All I need to know is that all the remaining competitors would have about [redacted] percent of the market, [redacted]. How that's allocated I don't know.").

56 Workpaper 1. In addition to these shares varying year by year, the product mix—i.e., the split of sales between game sales, downloadable content sales, and microtransactions—may change over time. These time-varying differences in the industry cast further doubt on the reliability of Dr. Schwartz's assumption.

57 Expert Report of Professor Joost Rietveld, February 8, 2024, ¶¶ 87, 102, 174.

fixed publisher market shares in 2008–2012. Dr. Schwartz argues that excluding Epic Games is "necessarily conservative" because Epic would take market share away from Valve.[58] However, Dr. Schwartz fails to capture *any* but-for world dynamism between 2012 and the present, which could include firm *exit* or other changes to the competitive landscape that would determine (and potentially raise) Valve's market share as a distribution platform from its market share as a publisher. That is, even supposing Dr. Schwartz were being conservative as to Epic, there is no economic basis for his "no exit" assumption, which could lead to an underestimate of Valve's but-for market share.

5. Dr. Schwartz fails to address game-level and publisher-level variation in his pass-through analysis, rendering his methodology incapable of estimating damages—if any—for the proposed class with class-wide evidence

5.1. Dr. Schwartz's pass-through analysis failed—and continues to fail—to reflect the widely recognized variation in pass-through rates across games

30. As a matter of basic economics, pass-through of publisher costs on to consumer prices will vary across publishers within the video game industry. Academic literature shows that pass-through depends on the scope of competition, differences across consumers in the value they place on a game, and how costly it is for a publisher to increase or decrease the number of games provided for sale.[59] Intuitively, variation in these factors across games makes sense: some games are unlikely to scare off many consumers with small increases in their prices, while others may see consumers switch to other games quickly with similarly small price increases.[60] Industry coverage and deposition testimony in this case demonstrate that game pricing is a complex process that reflects these differences across games.[61] For example, while Wolfire Games testified that any change in revenue

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58 Schwartz Opening Report, footnote 852.

59 E. Glen Weyl and Michael Fabinger, "Pass-Through as an Economic Tool: Principles of Incidence under Imperfect Competition," *Journal of Political Economy*, 121(3), 2013, pp. 528–583. See also Schwartz Opening Report, ¶ 383.

60 For example, see Langer Opening Report, ¶¶ 106–110.

61 Joseph Politano, "Video Games, Price Architecture, and the Zero Marginal Cost Revolution," *Apricitas Economics*, August 28, 2021, available at https://www.apricitas.io/p/video-games-price-architecture-and, accessed on May 3, 2024 ("Video games are on the forefront of new pricing, production, and distribution models that are shifting the way we pay for goods and services … The digital revolution has enabled many companies to completely ditch traditional models where consumers purchase games up front for a predetermined price. There is no longer a single price for most video games, but rather a complex network of prices and elaborate price architecture."); Deposition of Ricky Uy (Komodo), October 24, 2023, p. 187:6–21; Deposition of [redacted] January 11, 2024, p. 37:2–15; 30(b)(6) Deposition of [redacted] January 30, 2024, pp. 44:13–45:15. See also Langer Opening Report, footnotes 213, 220.

share would get entirely passed on to consumers,[62] [redacted] publisher has committed to a "no sale" policy and has therefore not passed through any of its change in revenue share.[63]

31. All three economic experts in this case agree that video game pricing is an individualized issue.[64] In fact, Dr. Schwartz, Prof. Chiou, and I agree that there is substantial variation in the types of games, developers, publishers, and consumers who exist in the video game industry.[65]

32. Nevertheless, Dr. Schwartz's methodology *assumes* that all publishers of all games would pass through savings on to consumer prices the same way as the median publisher[66] of Dr. Schwartz's sample of 124 games does.[67] Conceptually, his methodology *assumes* (rather than *demonstrates*) that proposed class members would pass through changes in Valve's revenue share in an identical fashion.[68] In fact, the only empirical evidence of game-level pass-through on Steam—Dr. Schwartz's analysis—demonstrates that pass-through likely varies across games.[69]

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62 Named Plaintiff Wolfire Games testified that any "commission rate savings" would get "passed through to customers." See 30(b)(6) Deposition of David Rosen (Wolfire Games), November 30, 2023 ("30(b)(6) Rosen (Wolfire Games) Deposition"), pp. 265:17–266:3 ("Q. What is the pricing experiment you're referring to? A. Passing on all of the savings from various commission rates on to customers. Q. Would Wolfire, in that scenario, keep any of the, as you put it, commission rate savings? Mr. Golden: Objection to form. The Witness: No. By Mr. Skok: Q. It would all get passed through to customers? A. Yes."). See also Langer Opening Report, footnote 136.

63 Langer Opening Report, footnote 219.

64 Prof. Chiou opined that "[p]roduct differentiation has important implications for the determinants of pricing … economic theory indicates that, in markets with differentiated products, pricing is driven by both the cost structure and *demand elasticity*." Chiou Report, ¶ 54. Regarding pass-through specifically, Dr. Schwartz acknowledged that "many factors influence pass-through, including the slope and shape of the demand curve, the slope and shape of the supply curve, and the degree of market competition." Schwartz Opening Report, ¶ 385. Likewise, I agreed that "[p]ublishers' pass-through rates will differ across games due to variation in how consumers respond to game prices." Langer Opening Report, ¶ 106.

65 For example, see Schwartz Opening Report, ¶¶ 23–28; Chiou Report, ¶¶ 35–49, 54–57, 69, 195–197; Langer Opening Report, ¶¶ 50–53, 98, 107–110. In addition, Dr. Schwartz acknowledges that games "are at different stages in their product version life cycle, face different degrees of competition, and so forth." Schwartz Reply Report, ¶ 243.

66 The median publisher is the publisher whose game-level pass-through rate as calculated by Dr. Schwartz happens to be in the middle of the 124 calculated rates. It is not the average.

67 Langer Opening Report, ¶ 116. Dr. Schwartz does not, however, refute that pass-through will differ across games. See Schwartz Reply Report, Section 8.4.1. Dr. Schwartz acknowledges that it is difficult to determine how much a price change for any single game is attributable to pass-through (¶ 234); he agrees that the isolated impact of the revenue share change matters for the pass-through analysis (¶ 237); he chooses to measure an average and median pass-through rate (¶¶ 237–238); and he argues with "my approach"—which is simply his game-level calculations—of calculating game-by-game pass-through (¶ 240). But he does not argue that pass-through will be the same across all games.

68 Langer Opening Report, ¶ 116.

69 I do not endorse Dr. Schwartz's analysis as providing reliable game-level pass-through rates. As I laid out in my opening report (which Dr. Schwartz now echoes), Dr. Schwartz's analysis has substantial shortcomings. For example, see Langer Opening Report, footnote 143; Schwartz Reply Report, ¶¶ 235, 239–243.

33. Dr. Schwartz does nothing to address this core flaw. He continues to assume that the median of 124 game-level estimates provides a reliable estimate of pass-through for all games sold on Steam. Only he now asserts that his approach—using a median—is "robust" by making a new assumption: any differences between his game-level pass-through rates are statistical "noise" around a true, common-to-all-games-and-all-publishers pass-through rate.[70]

5.2. Dr. Schwartz's new argument—that any observed differences in his game-level pass-through rate calculations are due to statistical "noise"—is an unproven assumption

34. Dr. Schwartz proposes a new argument to justify his use of the median as a reliable estimate for pass-through rates for all games and all publishers on Steam.[71] He now assumes that variation in his sample is "noise" that "is expected to, on average, have roughly no impact."[72] However, his new assumption simply exchanges one set of problems for another.

35. By ascribing all differences across games to "noise," Dr. Schwartz assumes there is no variation in game-level pass-through rates (or that it is unimportant). This assumption contradicts industry reporting, publisher testimony, economic theory, and statements by all three economic experts in this case—including Dr. Schwartz. I do not disagree that there may be variation in prices due to more than changes in revenue shares (what Dr. Schwartz calls "noise" in the data). However, *Dr. Schwartz needs to economically show that his approach can appropriately account for critical differences across publishers*, not merely assume away all differences. By doing so, Dr. Schwartz yet again assumes his conclusion that there is a representative, common pass-through rate rather than demonstrating it.

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70 Schwartz Reply Report, Section 8.4.1.

71 Dr. Schwartz has also added a claim that economic theory "indicates pass-through is likely between 0% and 100%." See Schwartz Reply Report, p. 127. As I explained in my opening report, Pless & van Benthem (2019) and others have explained how pass-through above 100 percent cannot be ruled out theoretically. See Jacquelyn Pless and Arthur A. van Benthem, "Pass-Through as a Test for Market Power: An Application to Solar Subsidies," *American Economic Journal: Applied Economics*, 11(4), 2019, pp. 367–401 at pp. 367–368, 371 ("While theory predicts—and empirical studies confirm—that pass-through rates fall between 0 and 100 percent across a wide range of market structures, those above 100 percent cannot be ruled out theoretically. [...] For example, analyses of alcohol taxes (Young and Bielinska-Kwapisz 2002, Kenkel 2005), cigarette taxes (Barzel 1976; Barnett, Keeler, and Hu 1995; Delipalla and O'Donnell 2001), and—in some cases—fuel taxes (Stolper 2016) have found that pass-through exceeds unity. In fact, more-than-complete pass-through is actually quite common.").

72 Schwartz Reply Report, ¶ 240.

36. To understand why this matters, consider [redacted], developer and publisher of [redacted]. As I showed in my opening report, [redacted] is one of the 124 games in Dr. Schwartz's sample, and [redacted] has a zero percent pass-through rate due to its "no sale" policy.[73] [redacted] differs from Wolfire Games, which testified that it would pass through the entirety of a revenue share change.[74] The difference in prospective pass-through for these two publishers may be due to differences in "the slope of the demand curve, the shape of the demand curve, the slope of the supply curve, and the degree of market competition," as Dr. Schwartz wrote in his opening report.[75] However, Dr. Schwartz now claims that the differences between these publishers are merely "noise" in the pricing process and that 20 to 25 percent pass-through is therefore accurate for both publishers. This claim does not reflect either his empirical analysis or the testimony in this case.[76] His methodology would misattribute damages—if any—by using a common pass-through rate that does not reflect the individualized degree to which a publisher would pass through any change in revenue share on to consumer prices.

5.3. Dr. Schwartz's anecdotal evidence and the prevalence of focal point pricing do not eliminate the need for individualized inquiry

37. In his reply report, Dr. Schwartz individually analyzes the price movements of several games and, in line with Section 5.1, provides evidence that game prices may move for many reasons that differ between games and between publishers.[77] However, the prevalence of between-game variation does not mean individualized inquiry is unnecessary. Rather, it points to the need for individualized inquiry: if game prices move for different reasons, then the assumption that they will respond identically to a given cost change lacks any foundation.

38. Likewise, Dr. Schwartz's new analysis of the prevalence of certain focal point prices in his sample of 124 games does not mean his sample is representative of the more than 90,000

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73 Langer Opening Report, footnote 219. As noted in my opening report, Dr. Schwartz calculates a zero percent change in price for [redacted] in his pass-through calculation exercise.

74 Named Plaintiff Wolfire Games testified that any "commission rate savings" would get "passed through to customers." See 30(b)(6) Rosen (Wolfire Games) Deposition, pp. 265:17–266:3 ("Q. What is the pricing experiment you're referring to? A. Passing on all of the savings from various commission rates on to customers. Q. Would Wolfire, in that scenario, keep any of the, as you put it, commission rate savings? Mr. Golden: Objection to form. The Witness: No. By Mr. Skok: Q. It would all get passed through to customers? A. Yes."). See Langer Opening Report, footnote 136. Wolfire Games does not have any games in Dr. Schwartz's sample of 124 games.

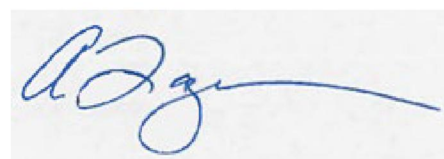
75 Schwartz Opening Report, ¶ 382.

76 I am not affirmatively claiming that the pass-through for these two games and publishers would be different. Rather, I am demonstrating that there is suggestive evidence that they would be different, and Dr. Schwartz has not provided any evidence that they would be the same.

77 Schwartz Reply Report, ¶¶ 240–242.

games on Steam or that individual inquiry is unnecessary.[78] Dr. Schwartz's analysis seeks to demonstrate that the "price levels observed for the games in [his] sample … are in the same cluster as for the general population of publisher/game pairs."[79] However, this analysis does not determine representativeness. At the very minimum, quantities sold are also important, since supply and demand are the relationship between *both* prices *and* quantities.[80] However, quantities are known to be different because total sales revenues are different: only those games with particularly high sales qualify for a change in Valve's revenue share and are therefore included in Dr. Schwartz's analysis. All other games necessarily have lower sales.

Executed this 12th day of August, 2024



Ashley Langer, Ph.D.

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78 Schwartz Reply Report, ¶¶ 246–250; Langer Opening Report, ¶ 105.

79 Schwartz Reply Report, ¶ 247.

80 Prof. Chiou has opined that "[p]roduct differentiation has important implications for the determinants of pricing … economic theory indicates that, in markets with differentiated products, pricing is driven by both the cost structure and *demand elasticity*." Chiou Report, ¶ 54. Regarding pass-through specifically, Dr. Schwartz has acknowledged that "many factors influence pass-through, including the slope and shape of the demand curve, the slope and shape of the supply curve, and the degree of market competition." Schwartz Opening Report, ¶ 385. Likewise, I agreed that "[p]ublishers' pass-through rates will differ across games due to variation in how consumers respond to game prices." Langer Opening Report, ¶ 106. Moreover, Dr. Schwartz's analysis does not show that prices are representative. Dr. Schwartz's analysis at most suggests that the prices of 124 games fall in the same price range as the "general population," but does not show that these 124 games include low- and high-priced games in similar proportions to the "general population."

6. Appendix A: Documents relied upon

Academic Articles

- Clément Carbonnier, "Pass-through of Per Unit and ad Valorem Consumption Taxes: Evidence from Alcoholic Beverages in France," *The B.E. Journal of Economic Analysis & Policy,* 13(2), 2023, pp. 837–863.
- E. Glen Weyl and Michael Fabinger, "Pass-Through as an Economic Tool: Principles of Incidence under Imperfect Competition," *Journal of Political Economy*, 121(3), 2013, pp. 528–583.
- E. Glen Weyl, "A Price Theory of Multi-Sided Platforms," *American Economic Review*, 100(4), 2010, pp. 1642–1672.
- Jacquelyn Pless and Arthur A. van Benthem, "Pass-Through as a Test for Market Power: An Application to Solar Subsidies," *American Economic Journal: Applied Economics*, 11(4), 2019, pp. 367–401.
- Jean-Charles Rochet and Jean Tirole, "Platform Competition in Two-Sided Markets," *Journal of the European Economic Association*, 1(4), 2003, pp. 990–1029.
- Jean-Charles Rochet and Jean Tirole, "Two-Sided Markets: A Progress Report," *The RAND Journal of Economics*, 37(3), 2006, pp. 645–667.
- Ke Rong, Qun Ren, and Xianwei Shi, "The Determinants of Network Effects: Evidence from Online Games Business Ecosystems," *Technological Forecasting and Social Change*, 134, 2018, pp. 45–60.
- Marc Rysman, "The Economics of Two-Sided Markets," *Journal of Economic Perspectives*, 23(3), 2009, pp. 125–143.

Book Chapters and Books

- David Evans and Richard Schmalensee, "The Antitrust Analysis of Multisided Platform Businesses," in *The Oxford Handbook of International Antitrust Economics*, eds. Roger D. Blair and D. Daniel Sokol, (New York: Oxford University Press, 2014), pp. 404–448.

Data

- Backup materials of Class Certification Expert Report of Steven Schwartz, Ph.D., February 8, 2024.

  - Schwartz Analysis Data ("PROD_Analysis_Data").
- Steam Key Redemptions Data ("mst_valve_key_red").
- Steam Key Requests Data ("mst_valve_key_req").

Depositions

- Deposition of Ricky Uy (Komodo), October 24, 2023.
- 30(b)(6) Deposition of David Rosen (Wolfire Games), November 30, 2023.
- Deposition of [redacted], January 11, 2024.
- 30(b)(6) Deposition of [redacted], January 30, 2024.
- Deposition of Steven Schwartz, April 18, 2024.
- Deposition of Ashley Langer, Ph.D., June 21, 2024.
- 30(b)(6) Deposition of Erik Peterson (Valve), November 15, 2023, Exhibit 295 VALVE_ANT_0000008–15.

Expert Reports

- Class Certification Expert Report of Steven Schwartz, Ph.D., February 8, 2024, and backup materials.
- Expert Report of Professor Joost Rietveld, February 8, 2024.
- Class Certification Expert Report of Ashley Langer, Ph.D., May 17, 2024.
- Class Certification Expert Report of Lesley Chiou, Ph.D., May 17, 2024.
- Reply Class Certification Expert Report of Steven Schwartz, Ph.D., July 12, 2024.

Produced Documents

- Valve Presentation, "Steam Rev Share – Group Update," VALVE_ANT_0046076.

Public Press and Other Web Content

- Becky Pakora, "Credit Card Annual Fees: Are They Worth It?, *Forbes*, June 24, 2024, available at https://www.forbes.com/advisor/credit-cards/credit-card-annual-fees-are-they-worth-it/, accessed on August 9, 2024.

- Epic Games Store, "Frequently Asked Questions," available at https://www.epicgames.com/site/en-US/epic-games-store-faq, accessed on August 8, 2024.
- Joseph Politano, "Video Games, Price Architecture, and the Zero Marginal Cost Revolution," *Apricitas Economics*, August 28, 2021, available at https://www.apricitas.io/p/video-games-price-architecture-and, accessed on May 3, 2024.
- Steam, "Community Market FAQ," available at https://help.steampowered.com/en/faqs/view/61F0-72B7-9A18-C70B#steamfee, accessed on August 8, 2024.

Note: In addition to the documents on this list, I relied upon all documents cited in my report, appendices, and exhibits to form my opinions.